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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/655,307

Applicant(s)

LEE, SHIN-SANG

Examiner

Rakesh K. Dhingra

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

Claims 1, 2 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Suk et al (US Patent No. 5,748,297) and Kim et al (KR Pub. No. 2002009190 A).

Regarding Claims 1,2: Admitted prior art teaches about a plasma etching apparatus comprising:

a processing chamber 12 in which a plasma etching process is performed;

a monitoring window 14 of transparent material being disposed in a side wall of said processing chamber.

Admitted prior art but does not teach about flute in the monitoring window and heater for heating the window.

Suk et al teach a plasma etching apparatus (Figure 4) having a window 20 with flute (and protrusion 22), which is at an inner surface of the window and faces the interior of the processing chamber (Column 3, line 50 to Column 4, line 6).

Suk et al further teach an optical detector 50 mounted outside said processing chamber and in alignment with the flute of said monitoring window so as to detect a change in the process occurring in said chamber via the flute.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use window with flute (and protrusion) as taught by Suk et al in the apparatus of admitted prior art to enable reliable end-point detection (Column 4, lines 48-55).

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Admitted prior art and Suk et al do not teach heater positioned relative to window.

Kim et al teach an etch apparatus (as per Figure) that has a heater 30 installed around flute (and protrusion) of an end-point detection window 12 so that heat is more concentrated at a portion of the monitoring window provided with the flute than at the other portions of the monitoring window (Detailed Description).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use heater for window as taught by Kim et al in the apparatus of admitted prior art and Suk et al to compensate for the temperature in the reaction chamber.

Claims 3-6 are rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Suk et al (US Patent No. 5,748,297) and Kim et al (KR Pub. No. 2002009190 A) as applied to Claims 1, 2 and further in view of Grimbergen et al (US Patent No. 6,835,275).

Regarding Claim 3: Admitted prior art in view of Suk et al and Kim et al teach all limitations of the claim (as explained above) except for shape of protrusion and the flute. Grimbergen et al teach an apparatus (Figures 1, 2, 5A) having a process monitoring system 25 that includes a window 130 with recess (flute) 145. Grimbergen et al also teach a window 130 (Figure 2A) that has a plug (protrusion) 136 that is like a solid portion. Grimbergen et al further teach that recess 145 may have any shape like circular, square etc and it is such shaped so as to allow a sufficient amount of radiation to pass through for proper process monitoring and also to control the access of energized gas species therein. Grimbergen et al also teach that the aspect ratio of the recess (flute) can be varied depending upon the deposition control required on the

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window and the depth and opening of recess (flute) could be selected independently also (Column 5, line 48 to Column 7, line 45).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use shape of flute (and protrusion) by selection as per process parameters as taught by Grimbergen et al in the apparatus of admitted prior art in view of Suk et al and Kim et al to enable proper process monitoring by the process monitoring system (includes window).

Further, it has been ruled by courts (Case Law) as follows:

“It was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).”

Regarding Claims 4, 5: Grimbergen et al teach a mask (polymer attracting means) 140 (Figures 3, 4, 5b) which may be part of chamber wall, or window or a separate structure that serves to reduce formation of process residues on the window 130 (Column 8, lines 47-55).

Regarding Claim 6: Grimbergen et al teach using mask (polymer attracting means) 140 in combination with electrical field source 220 and electrode 225 to maintain an electrical field that may be adapted to reduce deposition of process residues on the wall or on the window (column 11, lines 20-46, lines 60-65).

Claim 7 is rejected under 35 U.S.C. 103 (a) as being unpatentable over admitted prior art in view of Suk et al (US Patent No. 5,748,297), Kim et al (KR Pub. No. 2002009190 A) and Grimbergen et al (US patent No. 6,835,275 B1) as

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applied to Claims 1-4 and further in view of Yamada et al (Patent No. JP 60218846 A).

Admitted prior art in view of Suk et al, Kim et al and Grimbergen et al teach all limitations of the claim except for polymer attracting device being a cooling device.

Yamada et al teach an apparatus (Figure 6) having a cooling trap (polymer attracting device) 14 which absorbs reaction products before these reach light transmitting window 13 to enable detection of light to be performed with good reproducibility.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a cooling device as polymer attracting device as taught by Yamada et al in the apparatus per admitted prior art in view of Suk et al, Kim et al and Grimbergen et al to enable light detection with good reproducibility.

Response to Arguments

Applicant's arguments with respect to claims 1-3 have been considered but are moot in view of the new ground(s) of rejection as explained below:

1) Applicant has added new limitations to Claims 1, 2- "heat concentrated towards a portion of window provided with flute" by amending these claims and for which a new Reference (Kim et al – KR Pub. No. 2002009190 A) has been found which in combination with the references used in the earlier office action reads on the amended claims as explained above.

2) Applicant has also added new limitation to Claim 3 – "protrusion is a solid portion of window" by amending this claim and which has also been rejected by using the same references as used for claim 1, 2 as explained above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

1) Boyd et al (US Patent No. 6,953,515) teach an apparatus (Figure 6) that uses a window 132 for end-point detection of wafer planarizing process where the window has a raised portion (protrusion) and a hollow section (flute).

2) Eguchi (JP Pub. No. 40-7099184) teaches an apparatus (Figures 2, 3) that includes a window 46 and heaters 53 embedded in slots 51 that are provided in the window to prevent reaction products from adhering to window.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh Dhingra



Parviz Hassanzadeh
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Art Unit 1763